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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Wu Li

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EXAMINER

THOMPSON, CAMIE S

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

04/01/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/661,728	Applicant(s) LI ET AL.	
	Examiner Camie S. Thompson	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment filed 12/31/08.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-28 and 46-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-6, 8-28, 46-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed December 31, 2008 are acknowledged.
2. Examiner acknowledges amended claim 3.
3. Examiner acknowledges cancelled claims 2, 7 and 29-45.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-6, 8-28 and 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al., U.S. Patent Number 5,142,192 in view of Yano et al., U.S. Patent Number 6,699,596.

Takahashi discloses an electroluminescent element that includes insulating layers on both sides of a luminous layer wherein the luminous layer comprises ZnS:Mn (see column 3, lines 62-63) and the insulating layer comprises a fluoride-containing material such as MgF₂ (see column 3, lines 51-68). Additionally, embodiment 4 of the Takahashi reference discloses that the luminous layer can comprise SrS:Ce. Takahashi does not disclose that the phosphor layer is a rare earth metal activated barium thioaluminate or rare earth activated magnesium barium thioaluminate. Yano discloses a blue full color EL display comprising a phosphor thin film wherein the phosphor is a barium thioaluminate or magnesium barium thioaluminate with

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europium added as the activator (see column 2, lines 46-68). Column 3, lines 1-16 discloses that the atomic ratio of Mg to Ba may fall in the range between 0.05 and 0.8, $x = 1-5$, $y = 1$ to 15 $z = 3-30$ and $w = 3-30$. Also, the reference discloses that the phosphor thin layer is sandwiched between first and second insulating layers (see Figure 2 and column 6, lines 42-53). Column 2, lines 64-68 of the Yano reference discloses that oxygen may substitute for sulfur in barium thioaluminate to yield an oxysulfide. Also, example 1 of the Yano reference discloses that the magnesium barium thioaluminate film contains a substantial amount of oxygen. It is disclosed in column 6, lines 53-68 of the Yano reference that the substrate can be a glass or glass ceramic substrate. Yano also discloses that the phosphor thin film is annealed at 400 to 800 °C.

Additionally, Yano discloses that the light emitting layer comprising the phosphor thin film of magnesium barium thioaluminate is preferably about 100 to 2,000 nm thick (see column 4, lines 58-64). Column 7, lines 11-43 of the Yano reference discloses that the first thick film insulating layer has a thickness of 5-50 μm and the second insulating layer has a thickness of 100 to 500 nm. Yano also discloses that the first insulating layer can be barium titanate as per instant claim 47. Figure 2 of the Yano reference discloses a dielectric layer. Yano discloses in column 1 that blue luminescence can be achieved by $\text{SrS}:\text{Ce}$ (same phosphor used in Takehashi reference).

Yano also discloses that the layers are annealed. However, Yano does disclose that the luminescence of $\text{SrS}:\text{Ce}$ is short and that blue luminescence can be improved using thioaluminate phosphors such as $\text{BaAl}_2\text{S}_4:\text{Eu}$ (see column 1, lines 40-60). Therefore, it would have been obvious to one of ordinary skill in the art to use a thioaluminate phosphor such as $\text{BaAl}_2\text{S}_4:\text{Eu}$ in an electroluminescent element in order to have blue light with higher purity and a display of better quality. Neither reference discloses that the fluoride from the fluoride containing layer is

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partially infused into the phosphor layer. However, Yano does disclose that the layers are annealed as required by the present claims. Therefore, it would have been obvious to one of ordinary skill in the art to recognize that the fluoride from the insulating layer would be partially infused into the phosphor layer since the layer are annealed.

Response to Arguments

6. Applicant's arguments filed December 31, 2008 have been fully considered but they are not persuasive. Applicant argues that the combination of the Takahashi and Yano references do not suggest the phosphor of the present claims. Takahashi discloses a device comprising a metallic electrode; an insulating layer of magnesium fluoride and a luminous layer comprising SrS:Ce (blue emission) stacked on a glass substrate. Although Takahashi does not disclose the thioaluminate blue emitting phosphor, Takahashi does disclose a blue emitting phosphor in the luminous layer which directly adjacent to the insulating layer comprising a magnesium fluoride layer. Yano was brought in to show that the luminous layer can comprise a blue emitting phosphor such as barium thioaluminate. Applicant argues that Takehashi does not disclose the insulating on the top and/or bottom of the phosphor, which is critical for infusion into the phosphor layer. Takahashi discloses that the layers are stacked with the insulating layers on the top and bottom of the luminous layer comprising the phosphor. Yano shows that the blue emitting phosphor can be a thioluminate. Yano also discloses that SrS:Ce can be substituted with barium thioaluminate in order to have a longer lasting blue light emission. Yano discloses that the phosphor thin film is annealed at the same temperatures required by the present claims and thus it would be expected that the insulative layers would be partially infused into the

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phosphor layer as the Yano reference has the same method as the present claims. The combination of reference is analogous art. The motivation to combine is present by Yano in that it would be obvious to use the thioaluminate phosphor instead of the SrS:Ce in order to yield a longer lasting blue light emission. The rejection is maintained.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Camie S. Thompson whose telephone number is 571-272-1530. The examiner can normally be reached on Monday-Friday 8:00 am - 6:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1794

Camie S Thompson
Examiner
Art Unit 1794